Perceptions of Electronic Health Records in Mississippi

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ABSTRACT

This study reports perceptions of Electronic Health Record (EHR) adoption among key constituents in Mississippi to inform health care professionals and administrators about factors that influence the adoption and integration of EHRs into practice. The results from a survey conducted at two statewide health conferences in Mississippi indicated a high degree of optimism in regards to successful EHR adoption, but less for specific practices and in rural areas. These results are relevant to healthcare decision and policy makers to determine needed professional preparation and programming, if any, for current and future healthcare professionals; and to identify workforce development challenges lending insight into the technology skills needed to adopt and utilize EHRs at a meaningful level. Further, the assessment identified potential factors that may be associated with the current level of adoption of utilization of EHRs.

Keywords: Electronic Health Records, Health Information Technology, Health Informatics, and Technology Adoption

INTRODUCTION

William Hovarth recounts the experience of the British Air Defense Command circa World War Two: "To make effective use of [new technological developments such as radar] required drastic overhaul of inappropriate operating procedures and outmoded combat organizations. This is the situation facing the health industry today" [1, p. B-276]. He identifies the resistance among physicians to avoid interference and protect the privacy of their patients, yet points out the sharp rise of costs for consumers and hospitals as an impetus for change. Hovarth wrote this in 1968 speaking about the need for operational management techniques in the health industry. The situation today is similar; with EHR as an available technology envisaged to curtail rising costs, yet one that can disrupt organizational structure and medical practice, with risk of exposure of confidential patient records to new security threats. Hovarth issues a caution to management scientists, "For, if they are not careful, they may arouse unrealistic expectations of quick solutions to all managerial and organizational problems of the health field. These expectations could quickly turn into disillusionment in the face of the hard realities of dealing with the complexities in the organization of medical care" [1, p. B-276]. Some 40 years later, we must balance the expectation of EHRs with the complex reality of the healthcare industry.

EHR Characteristics, Benefits, Challenges

Electronic health records are similar in basic purpose to the traditional, paper-based records; however, by virtue of being digital they are readily accessed, duplicated, shared, and transported via networks, the least not being the Internet. AHRQ [2] defines EHRs as, "an inclusive system of information technology software, hardware, peripherals, and network connectivity that must be selected, acquired, installed, implemented, taught, maintained, and secured." The *digital* aspect of EHR opens up many possibilities ranging from patients who are empowered and engaged in their own care to aggregated databases of treatment outcomes and efficacy.

As with any major technological shift, there are several complex challenges, potential improvements, and development opportunities associated with EHR adoption. The expected goals of EHR adoption are reduction of health costs resulting from inefficiencies and duplications, quality of care improvement, better coordinated care across the continuum of healthcare services, promotion of evidence-based medicine, and improvement of record keeping and mobility [3; 4; 5; 6; 7]. Improvements in quality of care are expected from providing appropriate guidance to help guide medical decisions at the time and place of care and the reductions of medical errors, health disparities, incorrect patient information, and inappropriate and/or duplication of care. These outcomes work to advance the objective of patient-centered medical delivery [8].

Challenges associated with EHR adoption include compliance with federal legislation and state and federal privacy laws (HIPAA), EHR certification, technology development, rural and urban adoption, maintenance and support, and competitive choices [9; 10; 11; 12; 13; 14; 15]. In addition to the relationship with a complex health care environment, EHR adoption faces other significant adoption barriers including initial and ongoing investment; insufficient return on investments; lost productivity; increased legal exposure; increased management and administration effort; training and professional development; and changes on established business practices [13; 14; 16; 17; 18]. Further, these systems face regulatory scrutiny. The time and cost associated with the adoption of EHRs are significant and include the opportunity costs of productivity loss and taking resources from other investments such as new medical equipment [15].

Even with federal subsidy, provider adoption of EHR remains a complex problem, with basic adoption rates estimates around one in five [2; 19]. For one, EHR is but one component of a

complex and dynamic health care industry. The national EHR adoption mandate comes amid other health care reforms (e.g. universal health insurance coverage) and the intersections of emerging technologies including consumer health IT applications [20] and telemedicine, economic hardships, political uncertainty, judicial scrutiny, and environmentally related conditions (e.g. health concerns arising after the Deepwater Horizon Oil Spill in the Gulf of Mexico in 2010). As a whole, EHR adoption is not a singular problem but interdependent with many other equally important and resource-heavy issues.

Achieving a better understanding of adoption rates – at what stage and how they got there – is a fundamental step toward improving healthcare outcomes. This problem is complex, given the background of EHR adoption, including the innate challenges of and training necessary when adopting a new technology, the special challenges of medical providers in rural and underserved areas, the nature of technology and the industry, and the overarching sociopolitical climate. This study therefore looks to gain insight into the nature of EHR adoption among by gathering perceptions from key healthcare constituents.

METHODOLOGY

Purpose of the Study

The purpose of this study is to investigate the perceptions of EHRs and the resources needed of health care professionals and administrators to determine the factors that influence the adoption and meaningful use of EHRs. Eisner's Connoisseurship Model of Inquiry was used as the framework for this study and focuses on two key areas of connoisseurship and criticism [21; 22]. His approach is one of many frameworks in qualitative research and identifies that such research is both subjective and objective. In Eisner's model of inquiry, connoisseurship suggests that the researcher captures the data and transforms it into some type of public form in order to disseminate knowledge on the phenomenon studied. The second area to this model, criticism, implies that the research process of collecting data is a subjective and objective process (or "transactive" as defined by Eisner), thus the researcher needs not only to disseminate the information, but also provide a critique of findings in a positive and/or negative manner [21].

Research Design

A brief questionnaire was developed specifically for this study to identify common themes and issues associated with EHR adoption and usage. The questionnaire deployed was used to gather quantitative and qualitative data and consisted of demographic, five point Likert-scale, and open-ended questions. Items were based on existing adoption theory, although not intended to be a comprehensive theory-testing instrument.

Participants indicated their level of agreement (from strongly agree to strongly disagree) to the seven items. The first set dealing with their perceived level of optimism regarding EHR adoption. The first, I am optimistic about the rate of successful EHR adoption (1) in general, (2) in Mississippi, (3) in Mississippi's stand-alone practices, and (4) in Mississippi's rural healthcare settings. The next item, drawing from the Task Technology Fit Model [23] relates to alignment between tasks characteristics and technology characteristics: (5) EHRs currently match the tasks that the health care professionals perform. Two constructs common to the Technology Acceptance Model [24] and Diffusion of Innovation Theory [25]: (6) EHRs are useful, and (7) EHRs are easy to use.

The open-ended items are as follows: (8) What is the most advantageous aspect of EHRs?, (9) What is the most challenging aspect of EHRs?, (10) What aspect about EHR is not being adequately addressed?, (11) In 2014, Medicare and Medicaid will require EHR systems to be in place for practices to avoid a 1% non- compliance penalty. What impact will this requirement have on the practice community?, (12) What types of resources do you think are needed to spread the adoption and usage EHRs in the state?, and (13) What types of legal challenges (if any) have been identified with EHR adoption and use?

Questionnaires were disseminated at two statewide conferences: the Mississippi Health Summit (Spring, 2011) and the Mississippi Rural Health Association Annual Conference (Fall, 2011). Following collection, data were analyzed for similarities and differences among responses to determine perceptions of potential factors that may be associated with the current level of adoption of utilization of EHRs. Recurrent themes among rural healthcare professionals were also drawn for open form questions to better understand the connection (if any) of these themes in accordance with Stage One Eligible Professional Meaningful Use Core and Menu Set Measures for Electronic Health Records.

Participants

Questionnaires were distributed to 279 conference participants attending either the 2011 Mississippi Health Summit at The University of Southern Mississippi in Hattiesburg, Mississippi (April 2011) or the 2011 Mississippi Rural Health Association annual conference held at the Clyde Muse Center in Pearl, Mississippi (September 2011). Participants at the Mississippi Health Summit (n = 165) and the Mississippi Rural Health Association (n = 114) annual conference included health-related professionals and public officials in the State of Mississippi. The research team received 50 completed questionnaires for a total response rate of 18%.

FINDINGS

Demographic Data

The first section of the questionnaire was demographic to collect information about the participant including consent for participation, participant's name, organizational affiliation, current position and title, the number of years in the current position, and other relevant experience. Participant names, titles, and organizational names were omitted to ensure confidentiality.

Of the 49 participants who reported organizational affiliations in this study, the highest (34%) were from state organizations (n= 17). Followed by medical centers (n = 11) and academic institutions (n= 11), each accounted for 22% of reporting participants. Slightly less than one quarter (24%) of the participants reported 10 or more years of experience with 50% (n= 25) being within the first five years of employment (n= 25).

Participants were also asked about their relevant professional experiences in healthcare. Twenty-eight participants responded to this item. Of these, eleven (39%) reported practical experience including nursing, clinical physician practice, and

clinical administration; and eight (29%) reported education experience such as teaching, advising, and obtaining a graduate degree in a healthcare related field. Other categorical experience included four reporting health information management experience including computer programming, health information management, and electronic medical and health record management; three reporting state organization experience with the Mississippi State Department of Health (MSDH); two reporting assessment experience including administrative positions overseeing assessment and experience as an analyst; and four reporting other experience not directly related to healthcare including social security, serving as an education governing board member, public accounting and consulting.

Descriptive Data

Next, participants were solicited about professional opinions as related to the adoption and use of EHRs. Most participants were optimistic about the adoption of electronic health records in general however were less optimistic in specific relation to Mississippi. Table 1 provides an overview of descriptive data reported on electronic health record system adoption.

Table 1. Levels of Optimism for EHR Adoption.*

	Minimum	Maximum	Mean	SD
General	1.00	5.00	4.02	.94
Mississippi (MS)	1.00	5.00	3.63	1.15
MS stand-alone practice	1.00	5.00	3.10	1.07
MS RHC practices	1.00	5.00	3.08	1.20

* $n = 49$

Approximately 48% of the 49 participants believed EHRs match current practitioner task while (32%) were indifferent. All participants agreed to some level that EHRs are useful with 64% of the respondents (n = 32) indicating strong agreement and 18% somewhat agreeing. When asked whether EHRs are easy to use almost half (48%) of the participants (n = 24) reported some level of agreement, while 36% (n = 18) were indifferent.

The open-ended questions explored the most advantageous aspects of EHRs, the most challenging aspects of EHR, the aspect(s) of EHR that is not being adequately addressed, the impact of the mandate by Medicare and Medicaid to utilize EHRs in a meaningful way by 2014 to avoid a 1% penalty, the types of resources needed to spread the adoption and usage of EHRs in Mississippi, and the types of legal challenges (if any) that have been identified with EHR adoption and use. Responses from this section were organized into themes through three rounds; the first of categorical identification and response selection, then further refined the selected categories by compiling those categories that emerged with similar themes. The third round of analysis grouped categories into identifiable and explainable themes. Developed themes will be discussed in detail for each question.

Advantages of EHR Adoption and Use

The three predominant themes of perceived advantages of EHR adoption and use are that these systems *improve data*, *improve clinical processes*, and *increase record system functionality*. The first of these, *improves data*, is defined as any type of advantage in which the respondent thinks EHRs improve healthcare data that is available to practicing healthcare professionals. Categorical topics that were included in this theme include: centralized data, ability to share data, uniformity within the data, ability to have paperless data, and that the data related to an individual's healthcare is compiled.

The second theme, *improves clinical processes*, is defined as any type of improvement to the current practices and processes of clinicians. Categories within the improving clinical processes theme included the ability of EHRs: to increase disaster preparedness, improve clinical measuring and reporting, increase decision support, promote the continuity of care and the coordination of services for a patient, increase clinician efficiency, provide enhanced referrals, and utilize electronic prescriptions also known as e-prescriptions.

The third theme, *increases record system functionality*, is defined as those advantages associated with the increased functionality of using an electronic health record system. The categories included: improves clinician work flow, decreases error reduction, decreases duplication of services, increases patient quality care, and promotes quality care improvement. Additionally, the use of an EHR system as it relates to the system's functionality is that is allows for remote access, and improves billing processes, increases portability, increases convenience, and increases the speed of which healthcare information can be accessed and retrieved.

Challenges Associated with EHR Adoption and Use

Themes developed to address the responses to the most challenging aspects of EHRs and the aspects of EHRs that are not adequately being addressed include *financial challenges*, *technology issues*, *policy concerns*, and *organizational factors*. Each of these themes along with the respective categories associated with the theme will be provided below.

The first theme, *financial challenges*, is used to define any challenge of EHR adoption and its use that is associated with a financial barrier. Categories found within financial challenges included the cost associated with the adoption (initial start up costs), implementation, software equipment, and maintenance of the system including equipment upgrades and software updates; the lack of broadband coverage; and the lack of resources needed to provide support help, training, and education on how to meaningfully use EHRs.

Technology issues is another theme and describes categorical responses that relate specifically to barriers associated with the technology itself needed to utilize an EHR system. Categories included the lack of a standardized program; EHR system relevance, compatibility, complexity, flexibility, and reliance; the ability of vendors to meet healthcare providers and clinical needs; the lack of convenience and ease of use associated with using EHRs; the difficulty (or lack of) in providing clinical customization; and the strain associated with required workflow changes needed to successfully utilize EHR systems.

The third theme, *policy concerns*, is defined as those related to security, confidentiality, and workload concerns. Categories in this section included issues and concerns related to patient confidentiality, the ambiguity of a universal database for storage (risk of abuse and privacy breaches), system compatibility specific to linking across fragmented healthcare services, and increased documentation requirements by regulatory agencies.

Organizational factors, the final theme, describes the categories that are associated with the motivation and perceptions of healthcare workforce and the ability of the provider supply

adequate training, education, and resources needed to successfully integrate EHRs into practice. Categories among this theme included perceptions and willingness of healthcare professionals to "buy-in" or "adopt" EHRs, the lack of comprehensive data available within EHRs, deficiency in available training and education for healthcare professionals, lack of ability to implement systems based on provider size or geographic location, and the learning curve associated with the integration of an EHR system.

Aspects of EHRs Inadequately Addressed

In addition to identifying challenges associated with EHR adoption and use, participants were asked to identify the aspects of EHRs that are not being addressed. Because this question is an extension of the challenges associated with electronic health record adoption and use, four of the same themes were found which include *financial concerns*, *technology issues*, and *policy concerns*, and *organizational factors*. Additionally, some responses did not fit into these four themes. Therefore, a fifth category, other, was created to recognize and report these categories.

Financial concerns in relationship to aspects of EHRs that are not being adequately addressed included the needed technology support by providers to successfully purchase, install, maintain, and utilize EHR systems; the lack of resources of current providers to be able to provide appropriate training, education, and time release for current professionals; the costs associated with upgrades and updates to the system; and the lack of funding available for providers to integrate and utilize EHR systems meaningfully, specifically costs associated once the initial incentives currently available are removed or no longer available.

Technology issue categories that responders felt are not currently addressed include the effectiveness of system usability, system compatibility with other EHR systems regionally, statewide, nationally, and internationally; the follow-up capabilities of EHR systems; the technology comfort levels of current healthcare professionals; system outages; challenges with e-prescribing; the environmentally friendly aspect of being paperless; and how to safely transfer data to and from other sources.

In relationship to the aspects of EHRs that are not currently being addressed, public education (or lack of) was the only category associated within the organizational factor theme.

Three respondents were unsure of the current aspects not being addressed with EHRs or did not provide specific information recognizable for placement into a category. One respondent stated, "Most of it is being addressed." The second respondent stated, "None that I'm aware of." Finally, the third participant stated, "Not sure." In order to recognize these responses (while they do not provide any insight into specific aspects that aren't being addressed by EHRs) the other category was created to ensure these answers were also reported.

Impact of EHR Requirement on Practice Community

Participants were also asked to indicate the impact of the 2014 Medicare and Medicaid requirement on the practice community. This requirement will result in a 1% non-compliance penalty for those who do not utilize EHRs in meaningful ways. Themes emerging from participant responses included a *decrease in providers*, *accelerated adoption*, *compliance*, and *cost*. A fifth category, *other*, was also created for this item as some of the participant responses did not fit into the emerging themes.

The first theme was a decrease in the number of providers and healthcare professionals. Categories included the retirement of older physicians, the disincentive to accept Medicare and Medicaid beneficiaries in clinics, the decrease in the number of providers and practices available, increased service cost (as a result of non-compliant penalties) for those providers unwilling to adopt EHRs, and the disincentive for healthcare professionals to continue work in the field.

The acceleration of adoption was also reported by many respondents as a result of the mandate to utilize EHRs as many providers and physicians would not want to face the non-compliance penalty.

Increased compliance categories that emerged within the compliance theme included general compliance with Medicare and Medicaid, an increase of EHR non-use in provider medical liability, an increase in pressure on the vendors to meet deadlines, and an increase in accountability to adopt some type of EHR system and use it in meaningful ways.

Increased costs was another theme and included categories such as: additional costs associated with training, the economic impact the mandate with have on healthcare providers' operating costs, and increased cost associated with adequate release time for healthcare professionals to learn how to use EHRs.

The other category was identified to include responses that did not correlate with the emerging categories and themes associated with this questionnaire item. Responses in this theme included comments such as "not sure," "little or no change," or "huge and significant." In addition, one respondent stated that the mandate will decrease the time with patients." Although these responses appropriately answered the question, they did not fit within the emerging themes.

Resources Needed to Adopt and Use EHRs

The three prominent themes for the types of resources needed to spread the adoption and usage of EHRs in the state include support, coordination and collaborative efforts, and financial assistance or incentives. Almost unanimously were the first three themes among respondents. However, a fourth category was established for other responses that did not fit into the three emerged themes for resources.

Support for resources to assist in the adoption and use of electronic health records included the following categories: technology training and support, education, webinars, increased IT staff in the healthcare facilities, and broadband access.

Coordination and collaborative efforts categories included collaboration with community organizations, statewide meetings, the need for a statewide coordinated system, applicant assistance while adopting and utilizing electronic health records, and participation and collaboration of insurance companies during the adoption process.

Financial assistance and/or incentives was the most commonly cited resource with categories including state and federal funding (incentives and assistance) to assist with the

infrastructure, purchase, implementation, and maintenance of electronic health record systems, affordable technology training and education for healthcare professionals, and the ability to add IT costs to capital payment models for cost reimbursement to Medicare and Medicaid in order to assist in the financial costs of adopting an electronic health record system.

Other responses included more involvement from public relations, documentation for electronic health records, and the removal of the EHR requirement allowing the providers to decide whether or not they should adopt electronic health records. Additionally, one participant responded that they were not sure of the resources needed to adopt and utilize electronic health records.

Legal Challenges Associated with EHR Adoption and Use

Themes relative to the types of legal challenges that have been identified with EHR adoption and use include confidentiality and privacy, data sharing and documentation, and system security.

Participants consistently reported confidentiality of patient data and patient privacy as a legal challenge associated with utilizing electronic health records. In addition, the health insurance portability and accountability act of 1996, more commonly referred to as HIPAA, was another commonly reported legal concern in relation to protecting patient confidentiality and privacy. Additionally, providing patients the right to opt-out of electronic health records and health record sharing was also a cited concern.

Data sharing and documentation was another theme that included categories such as data sharing and data access; the potential for unidentified health diagnoses or the lack of follow-up for abnormal results of labs and procedures; foreseeable problems with marginal charting by technology-challenged providers; the chance of late entry of notes; and the lack of standardized documentation.

System security was also a theme and included the protection of individual identities, individual health records, and concerns about the likelihood of data breaches and computer hackers being able to obtain electronic health information more easily than with traditional systems and paper records.

DISCUSSION

Healthcare professionals identified advantageous aspects of adopting and utilizing electronic health records which were consolidated into three general themes: *improving data*, *improving clinical processes*, and *increasing record system functionality*. Advantages of *improving data* included the ability of health records to be centralized, shared, uniformed, compiled and paperless. Within the *improving clinical processes* theme, responses included the ability for clinical measuring and reporting, enhancing available decision support, promoting the continuity and coordination of care, the potential for decreased duplication of services, and access to tools which could assist healthcare professionals in decision support. Finally, the ability of electronic health record systems to *improve record system functionality* provides the opportunity to alleviate time-consuming processes such as billing, can decrease errors in patient services, and may improve patient care by providing quick, convenient opportunities for health care providers to access medical information. These advantages may be particularly useful in rural areas where individuals may have to travel greater distances to receive medical treatment as their health records would be able to be easily retrieved and shared when utilizing an electronic health record system.

Identified perceived challenges currently associated with the adoption and use of electronic health records included *financial challenges*, *technology issues*, *policy concerns*, and *organizational factors*. Financial challenges may significantly impact the adoption process for electronic health records. While incentives are in place to assist providers in adopting EHRs, these funds are not adequate to purchase, train, implement, and sustain electronic health record systems. Further, some healthcare professionals believe the costs of adopting and using electronic health records outweigh the non-compliance penalties that will go into effect in 2014. Additionally, many rural healthcare providers are older and findings indicate that these mandates decrease incentives for aging healthcare providers to continue practicing, which could result in a reduction of the number of providers and healthcare professionals currently practicing in rural areas of Mississippi.

Along with financial issues, are those challenges related to technology. Considerations include the relevance, compatibility, complexity, flexibility, and reliance of the system. Lack of standardized programs, convenience, and ease of use of the EHR systems continue to challenge the adoption and use of EHRs. Additionally, the difficulty associated with the required workflow changes, and any change to current practice in general, will create barriers to the adoption process. Maintaining patient confidentiality, the potential risk of abuse and privacy breaches, and increased amounts of documentation required by regulatory agencies are policy concerns of healthcare professionals. Further, the lack of standardized systems integrated within the state and the compatibility specific to linking across fragmented healthcare services presents challenges to the adoption process. Motivation and perceptions of healthcare workforce and the ability of the provider supply adequate training, education, and resources needed to successfully integrate EHRs into practice are also a challenge to adopting electronic health records. Without "buy-in" from key constituents, even with financial support, providers will find it difficult to properly adopt and utilize these systems.

Aspects that participants felt are not being adequately addressed included financial costs of adopting and supporting meaningful use of electronic health records, lack of resources to provide appropriate training and education for healthcare professionals, and the effectiveness of system usability and compatibility with other EHR systems regionally, and statewide. Additionally, down time required for system updates, upgrades and potential outages that may result from faulty or outdated equipment should also be evaluated. Such concerns will hinder the adoption and use of EHRs and may potentially cause providers to keep two sets of records (one paper and one electronic) that will result in increased workload and decreased levels of efficiency for clinicians.

Identified themes relevant to the impact of the EHR requirement on the practice include an *accelerated adoption model*, a *decreased number of providers and healthcare professionals*, and *increased compliance and costs associated with the adoption of EHRs*. Participants had two opposite perspectives

on the impact of the mandate. One group of respondents believed the mandate would accelerate the adoption process and increase compliance with the mandate. Because financial incentives are built in for early adopters and penalties will not start for non-compliance until 2014, it may be beneficial for providers to get on board early to recoup some of the financial burdens of adopting EHRs within their practices. Categories within this theme include the additional costs associated with training, the economic impact the mandate will have on healthcare providers' operating costs, and the increased cost associated with adequate release time for healthcare professionals to learn how to use EHRs.

The other group of respondents pointed to a complete opposite perspective indicating that older physicians may retire due to the mandate, and that will result in a decrease in the number of providers and professionals in rural healthcare community. This is a cause for concern, as the state of Mississippi already has the lowest doctor per capita of any state in the United States. This may lead to a greater disparity in provided healthcare to those citizens within rural areas and widen the gap between the services these citizens are provided. Further, the increased costs incurred by healthcare providers who may be already financially struggling to stay afloat may impact the number of providers and healthcare professionals within the state. State resources such as financial assistance and training and education may be one solution to assisting professionals in rural areas.

Among the resources identified that are needed to adopt and use electronic health records includes support, coordination and collaborative efforts, and financial assistance and incentives. Most respondents reported the need for technology training and support, education, and professional development opportunities such as conferences or webinars. Additionally, respondents indicated the need for additional onsite IT professionals and broadband access to the list of support needed.

There was also recurring theme of statewide collaboration including a statewide coordinated system, and partnerships with community organizations. Applicant assistance while adopting and utilizing electronic health records and participation of insurance companies during the adoption process were also mentioned as resources needed to successfully integrate EHRs.

Financial assistance was the most commonly cited resource needed with categories including state and federal funding (incentives and assistance) to assist with the infrastructure, purchase, implementation, and maintenance of electronic health record systems, affordable technology training and education for healthcare professionals, and the ability to add IT costs to capital payment models for cost reimbursement to Medicare and Medicaid in order to assist in the financial costs of adopting an electronic health record system. Clearly the current incentive program by Medicare and Medicaid does not adequately support the adoption and meaningful use of electronic health records.

Legal challenges associated with EHR adoption and use included confidentiality and privacy, data sharing and documentation, and system security. As privacy is already a huge concern in regards to patient information with such acts as HIPAA in place, it is not surprising that respondents felt confidentiality and privacy are appropriate legal concerns and will increase liability for breaches in information. Additionally the increased risk for unidentified health diagnoses or the lack of follow-up for abnormal results of labs and procedures, etc. is a legitimate concern for healthcare providers and professionals. Communication problems can result in an increased risk for clinical negligence or medical malpractice and the ability for information to be entered electronically with no clear communication standard in place may increase the probability of such an issue arising. System security should also be included in legal concerns as the protection of individual identities, individual health records and the ability for illegal hacking and confiscating personal information being heightened with the use of multiple electronic health records systems.

LIMITATIONS & FUTURE RESEARCH

While the study provides general perceptions of EHRs within the state of Mississippi, it is not guaranteed that these perceptions are representative of the rural area population. Further, while the findings of this study provide insights for the state of Mississippi, they may not be useful in forming generalizations about other southeastern rural areas or national rural areas. Thus, caution should be taken when considering the potential implications of this study when compared to other state rural areas.

Information derived from this study may serve as a foundation for future research studies involving the adoption and use of EHRs in rural areas on a state, regional, or national level. Convenience and maximal variation sampling techniques were utilized for the needs assessment with the selection of participants based on attendance at a statewide healthcare conference. This sampling was utilized to gather information from participants who displayed different attitudes and rates of adoption of electronic health record adoption and use.

CONCLUSION

Based on the findings it is evident that most healthcare professionals are optimistic about the successful adoption and use of electronic health records in general. However, when asked about their optimism for adoption in Mississippi, self-reported levels of optimism were lower than optimism levels in general. Mean scores for levels of optimism for Mississippi's stand-alone practices and rural healthcare practices were low with rural healthcare practices reporting the lowest mean score (M = 3.08, SD = 1.20). This suggests that healthcare professionals in the state of Mississippi are generally optimistic about electronic health record adoption, however are less likely to be optimistic about the adoption of EHRs within the state.

Further, findings from this study suggest further research should be conducted to investigate perceptions of Mississippi's rural healthcare practices, as reported levels of optimism were the lowest for this particular group within the state. Since rural healthcare settings typically have scarce resources, few providers, and large numbers of Medicare and Medicaid patients, it is imperative that factors that impede or facilitate EHR adoption, specific to this population, should be explored. Failure to better understand this unique setting and the challenges of EHR adoption and use will result in a greater disparity of healthcare services provided in rural areas of the state.

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